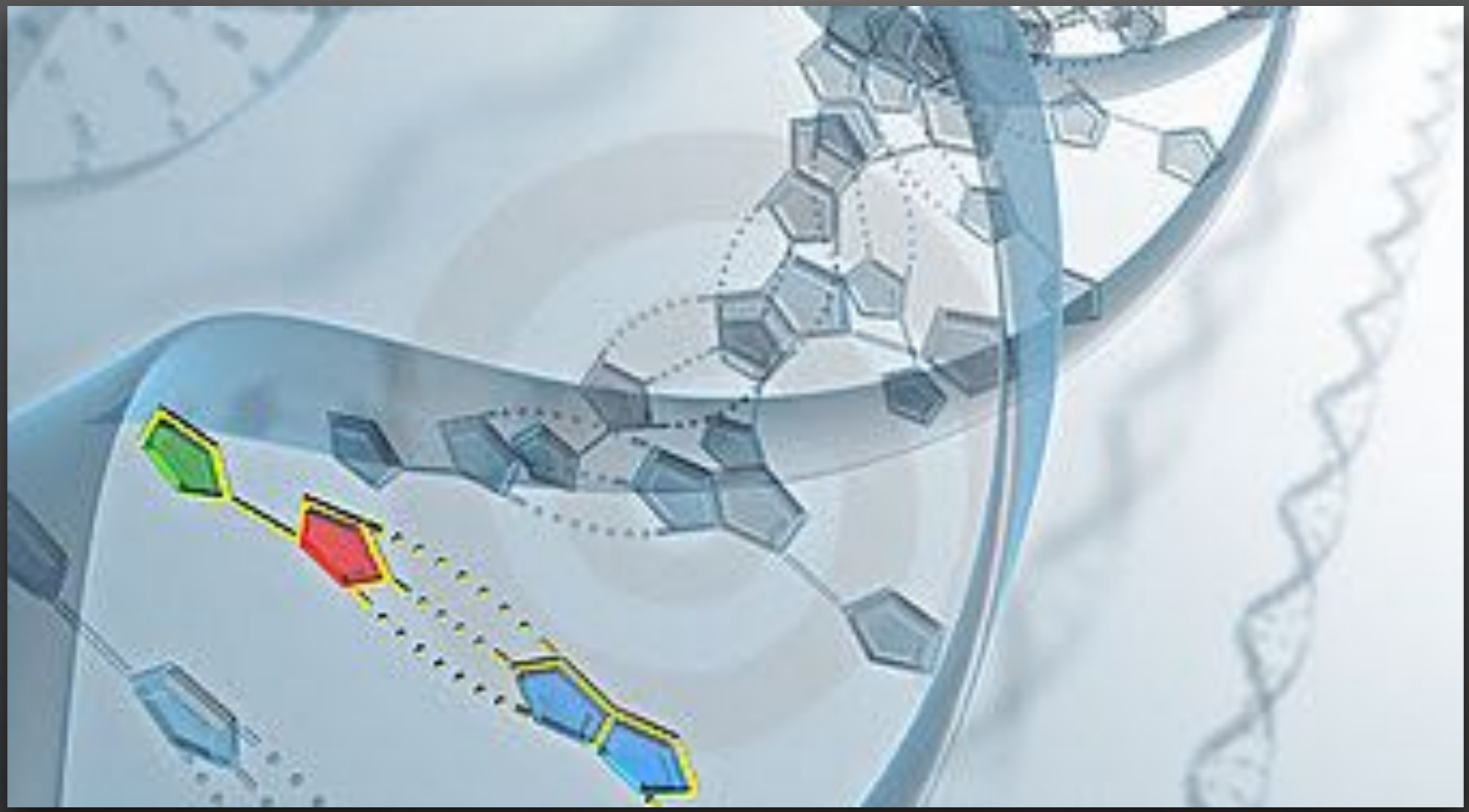


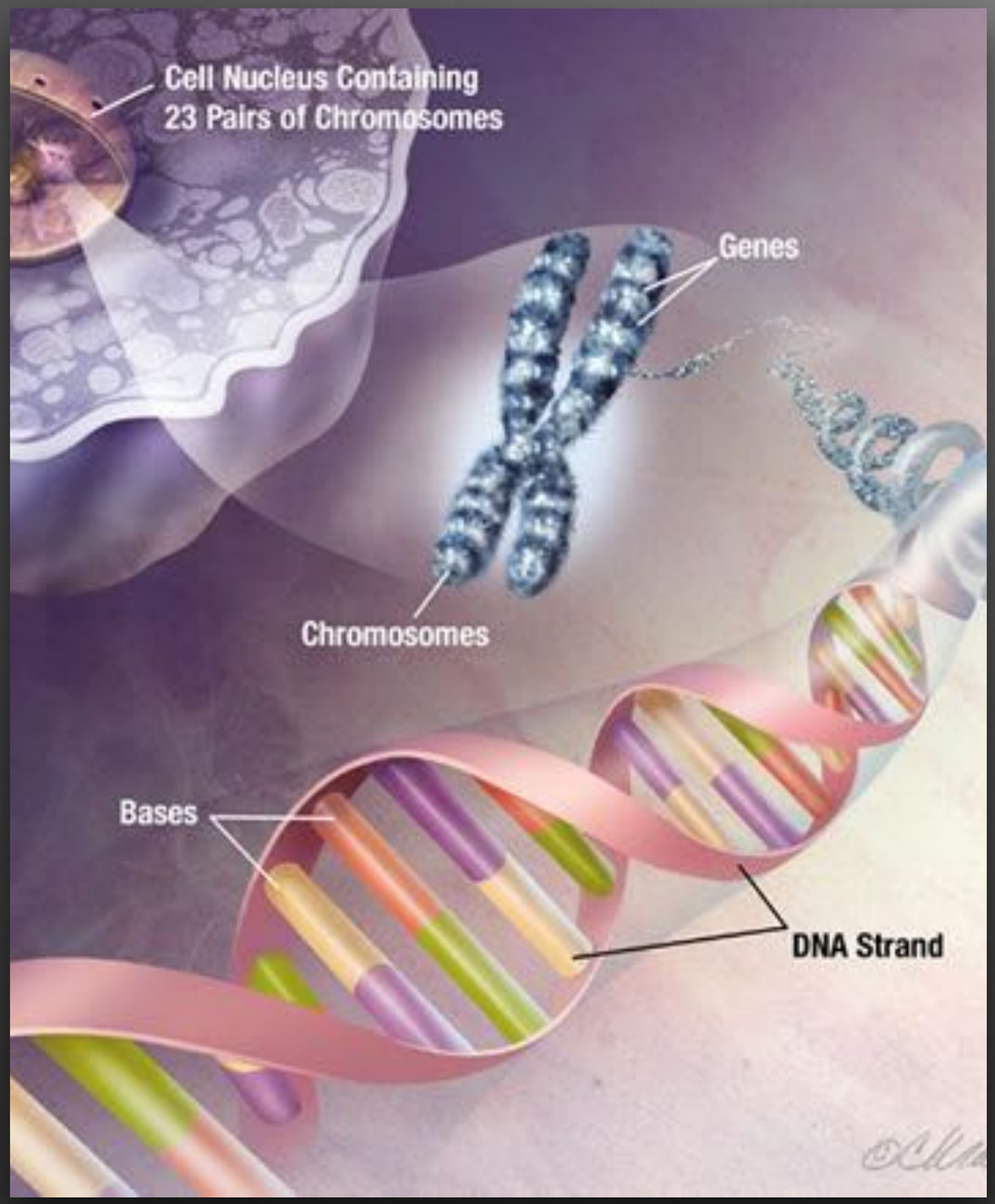
Mendel's Work

Introduction to Genetics & Heredity

Gregor Mendel

In the mid nineteenth century, a priest named Gregor Mendel tended a garden in a central European monastery. Mendel wondered why different pea plants had different characteristics.

Some pea plants grew tall, while others grew short. Some plants produced green seeds, while others produced yellow seeds. Some seed shapes were round, while others were wrinkled.



Mendel′s experiments in that peaceful garden would one day revolutionize the study of heredity. Heredity is the passing of physical characteristics from parents to offspring.

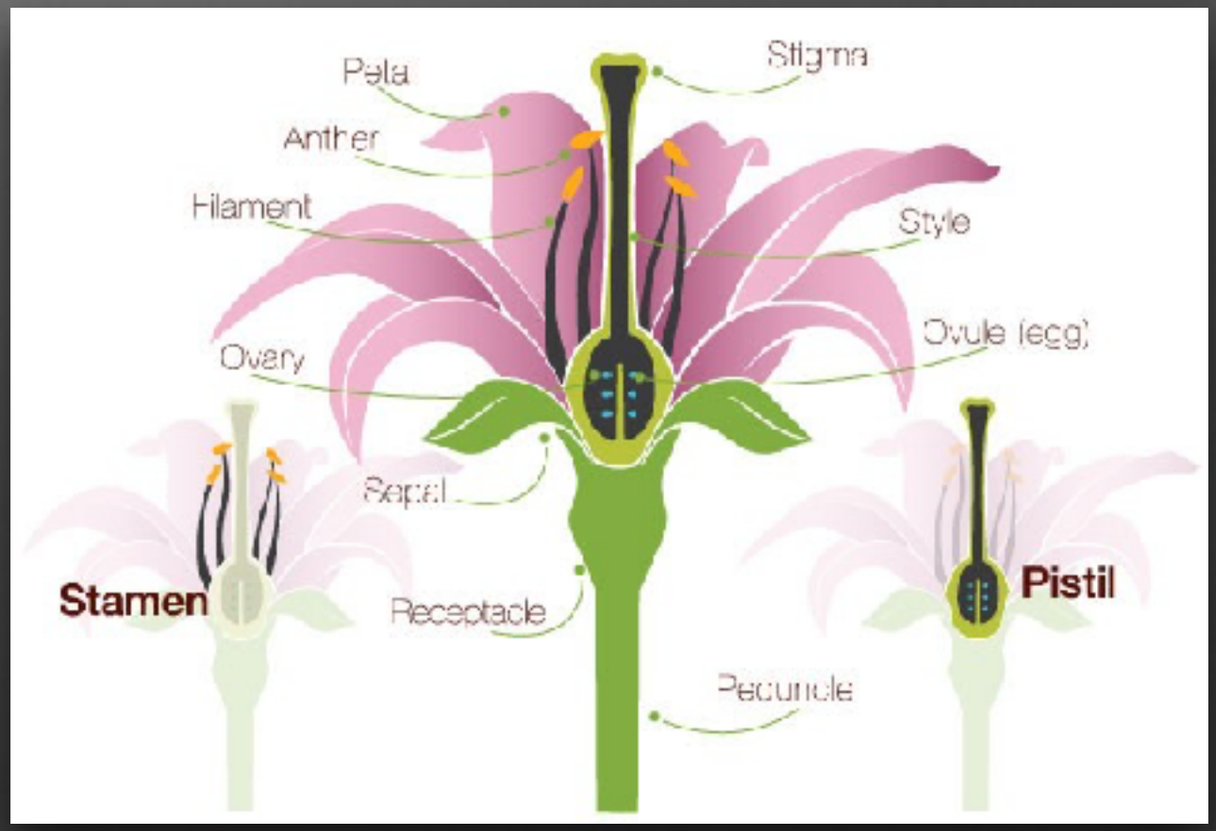
Gregor Mendel was curious about the different forms of characteristics, or traits, of pea plants. Each different form of a characteristic, such as a stem height or seed color, is called a trait.

Mendel observed that the pea plants′ traits were often similar to their parents. Sometimes, however, the plants had different traits. Mendel's work was the foundation of genetics, the study of heredity.

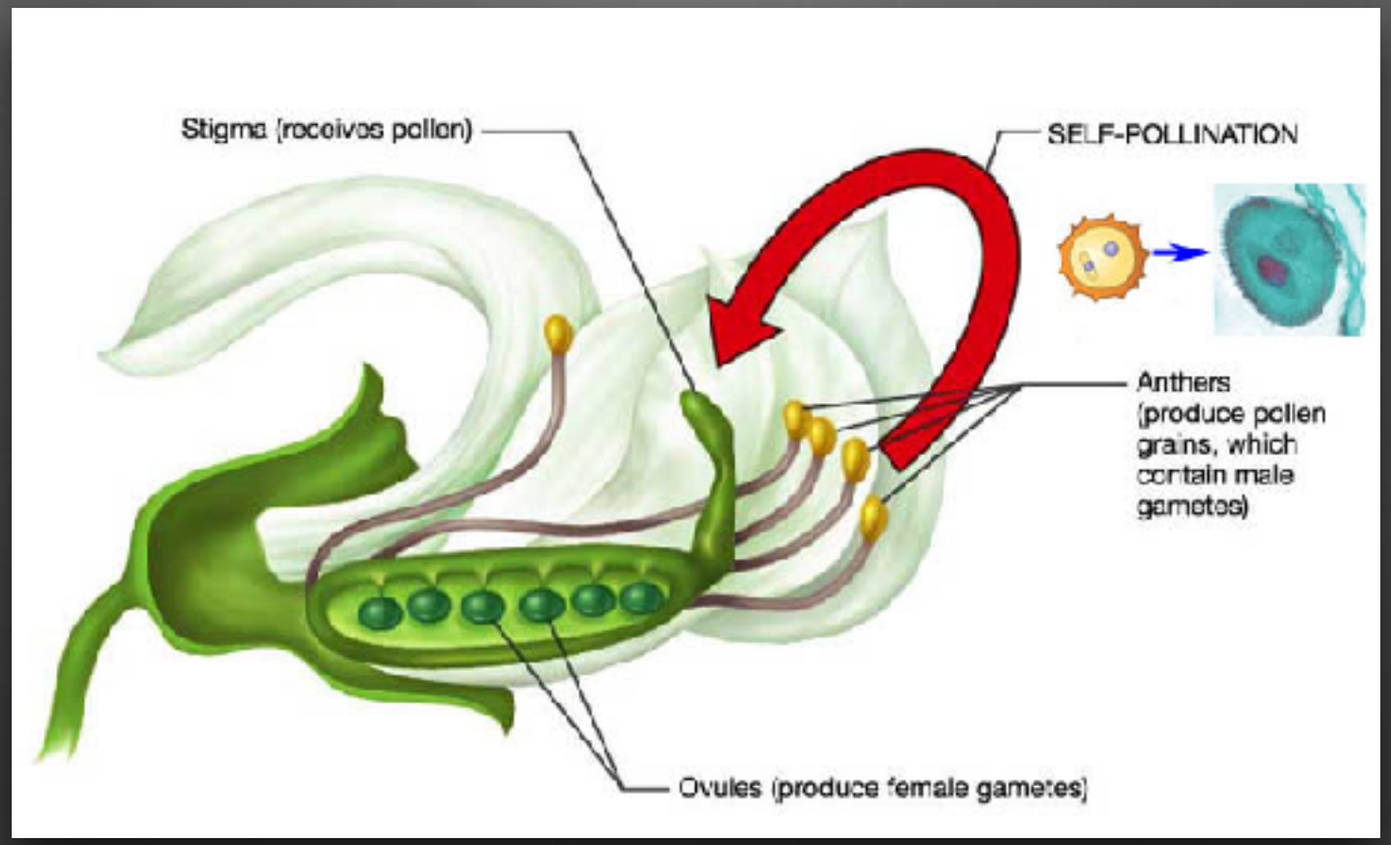
Anatomy of a Flower

The flower's petals surround the pistil and the stamens. The pistil produces female sex cells, or eggs. The stamens produce pollen, which contains the male sex cells, or sperm.

A new organism begins to form when egg and sperm join in the process called fertilization.



Before fertilization can happen in pea plants, pollen must reach the pistil of a pea flower. This process is called pollination. Pea plants are usually self - pollinating.



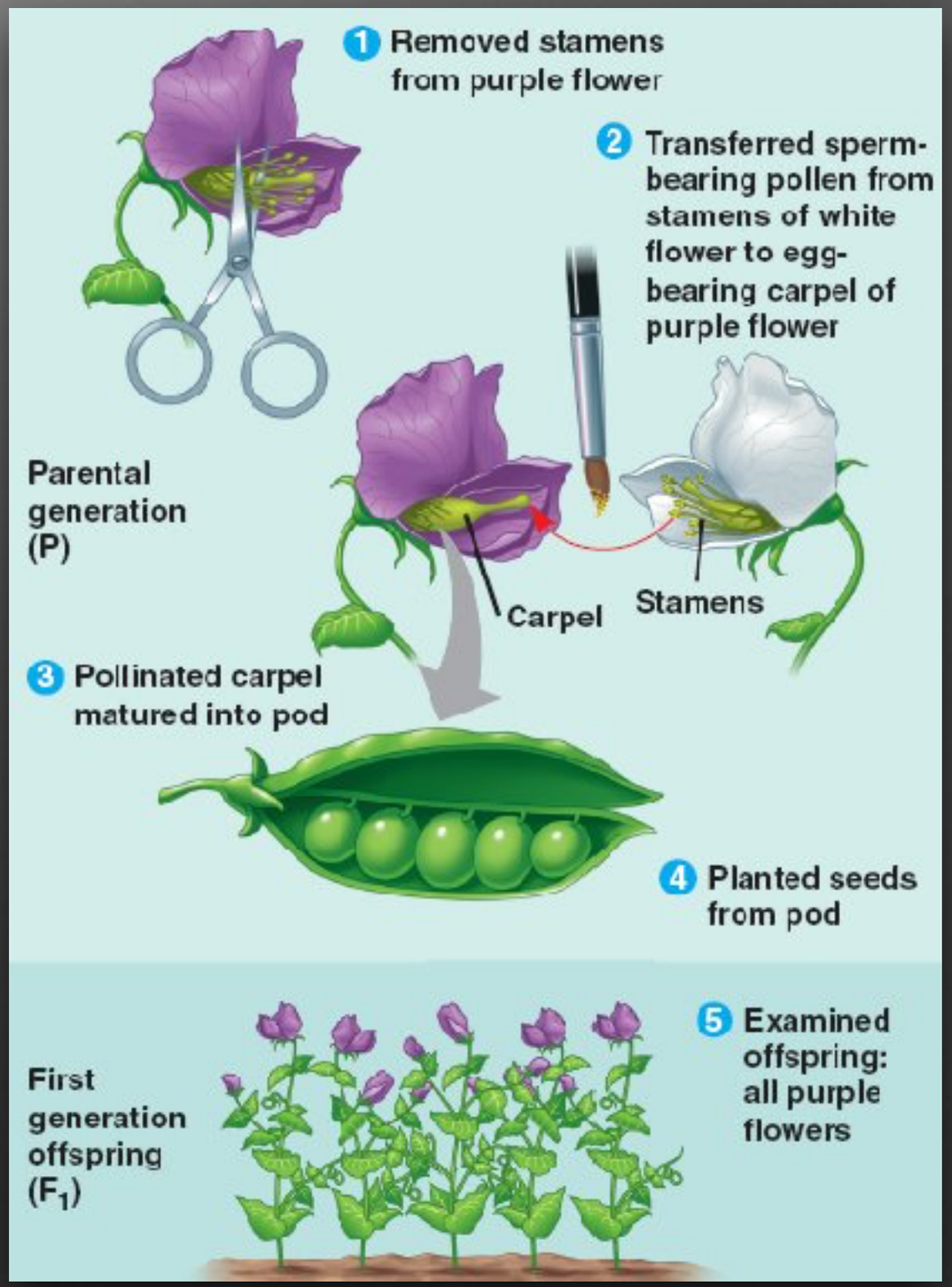
In self-pollination, pollen from a flower lands on the pistil of the same flower. Mendel developed a method by which he cross-pollinated, or ′crossed′, pea plants.

Crossing Pea Plants

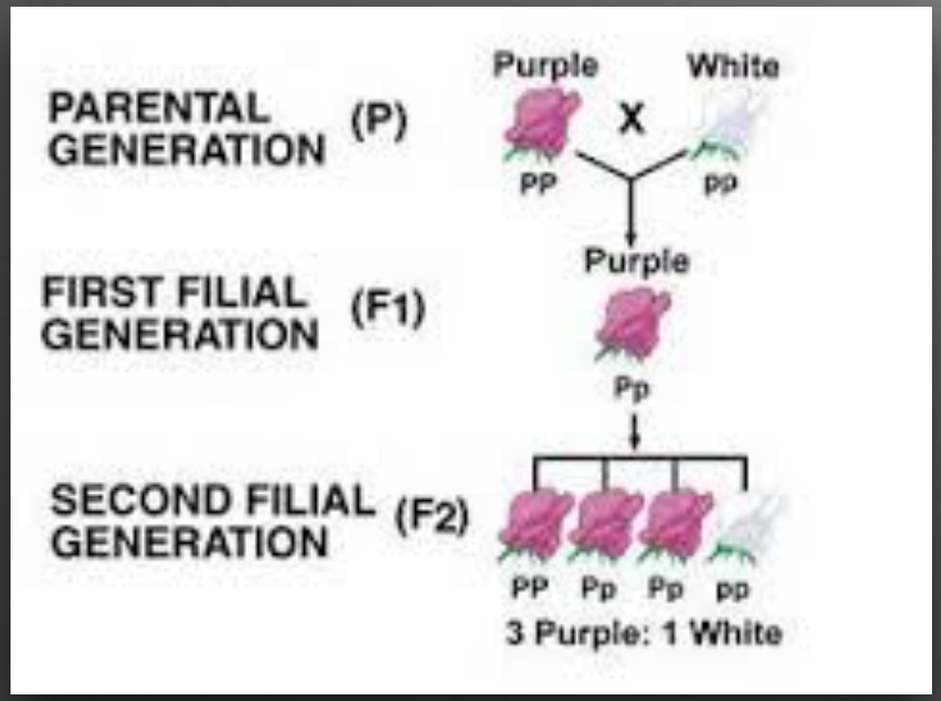
To cross two plants, Mendel removed the pollen from a flower on one plant. He then brushed the pollen onto a flower of a second plant.

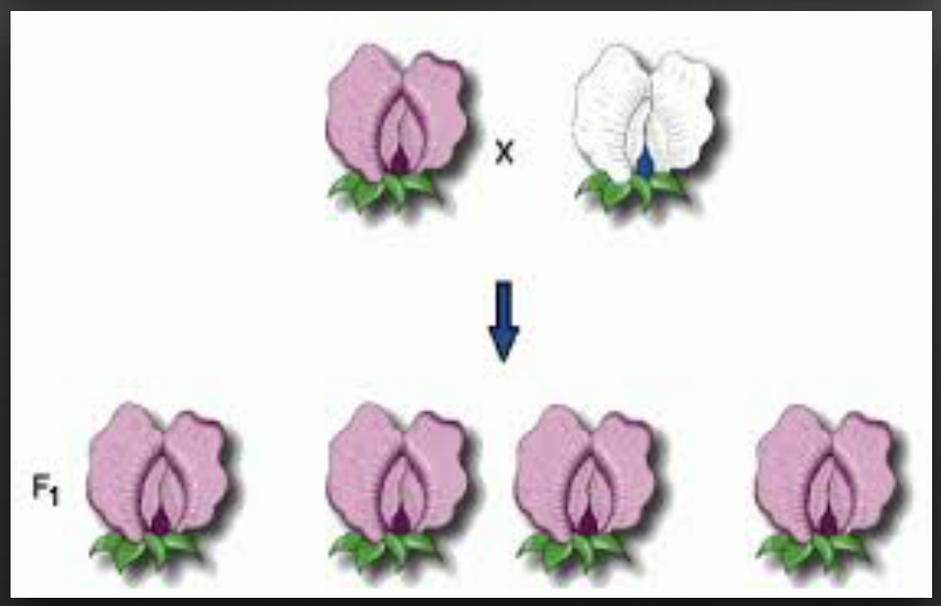
Mendel decided to cross plants with contrasting traits – for example, tall plants and short plants. He crossed purebred tall plants with purebred short plants.

These parent plants, the P generation, were purebred because they always produced offspring with the same traits.



F_1 & F_2 Offspring





The F_1 Offspring

The offspring from the cross are the first filial generation, or the F_1 generation. In all of Mendel's crosses, only one form of the trait appeared in the F_1 generation.

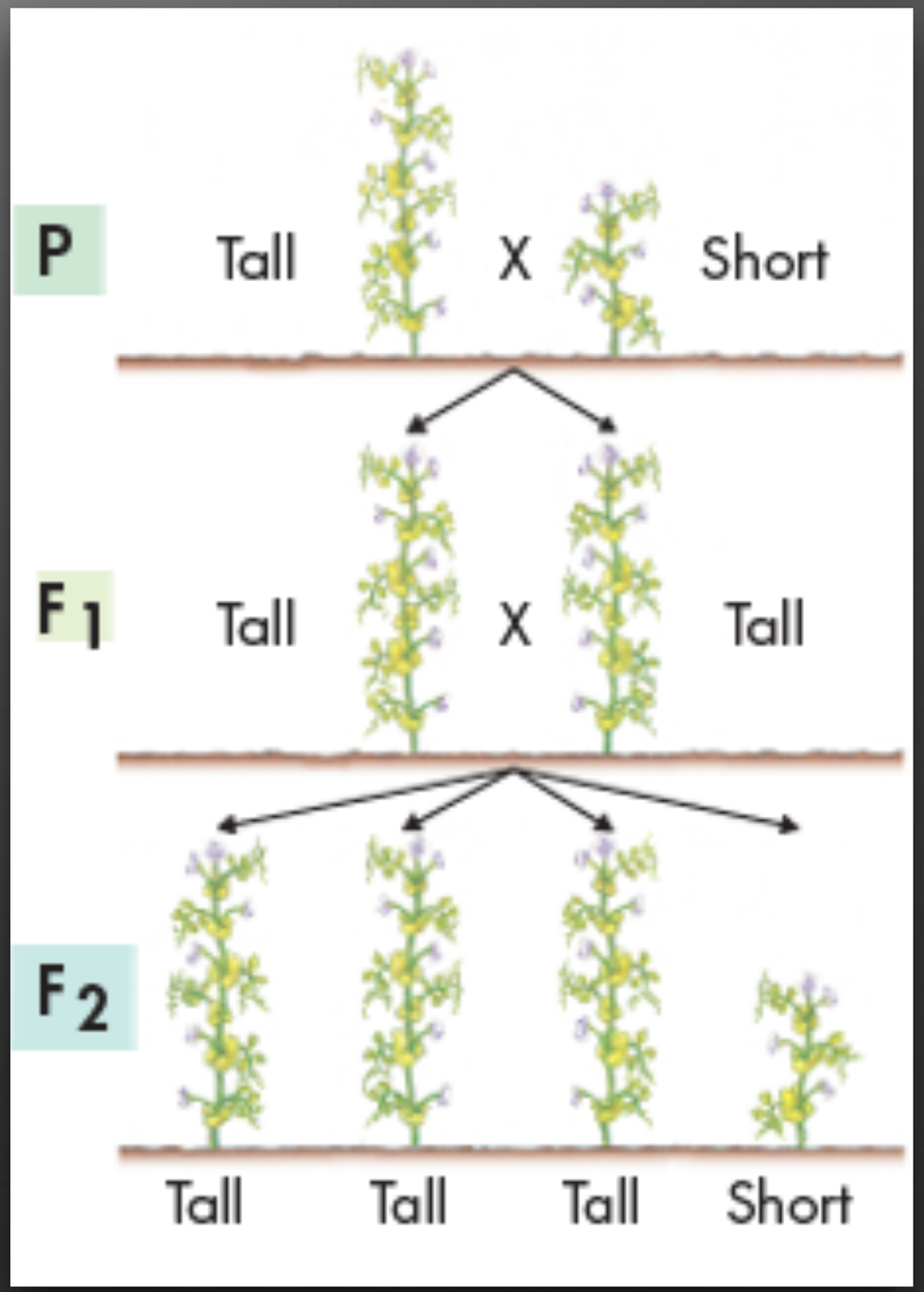
The F_2 Offspring

When the F_2 generation were fully grown, Mendel allowed them to self-pollinate. In the F_2 generation the 'lost' form of the trait always reappeared in about one fourth of the plants.

Dominant & Recessive Alleles

From his results, Mendel reasoned that individual factors, one from each parent, control the inheritance of traits. The factors that control each trait exist in pairs.

Each parent contributes a factor. One factor in a pair can mask, or hide, the other factor. The tallness factor, for example, masked the shortness factor in the pea plants.



Today, scientists use the word gene for the factors that control traits. Alleles are the different forms of a gene. The gene that controls stem height in peas, for example, has one allele for tall stems and one for short.

An organism's traits are controlled by the alleles it inherits from its parents. Some alleles are dominant, while other alleles are recessive.

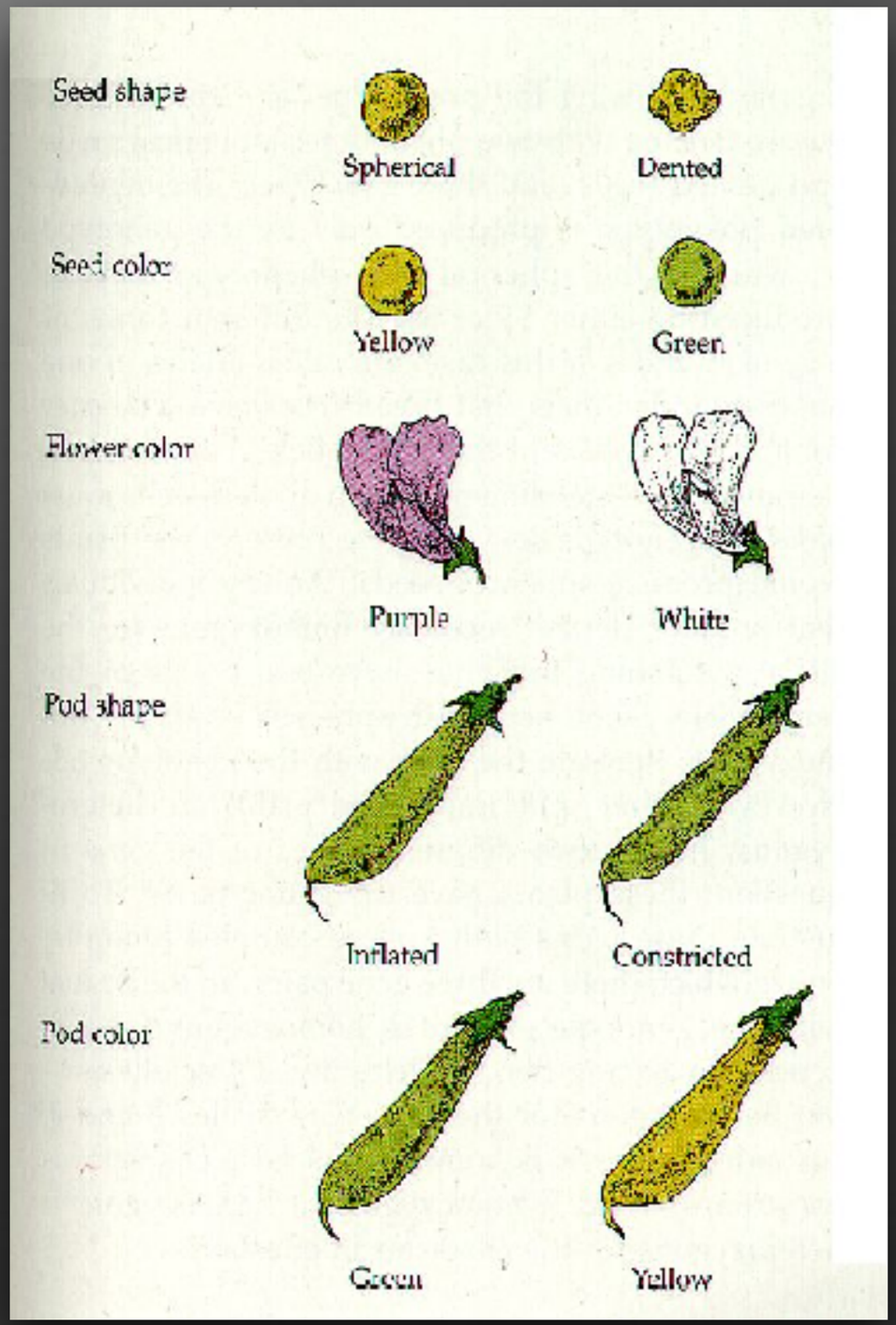
A dominant allele is one whose trait always shows up in the organism when the allele is present. A recessive allele is hidden whenever the dominant allele is present.

A trait controlled by a recessive allele will only show up if the organism does not have the dominant allele.

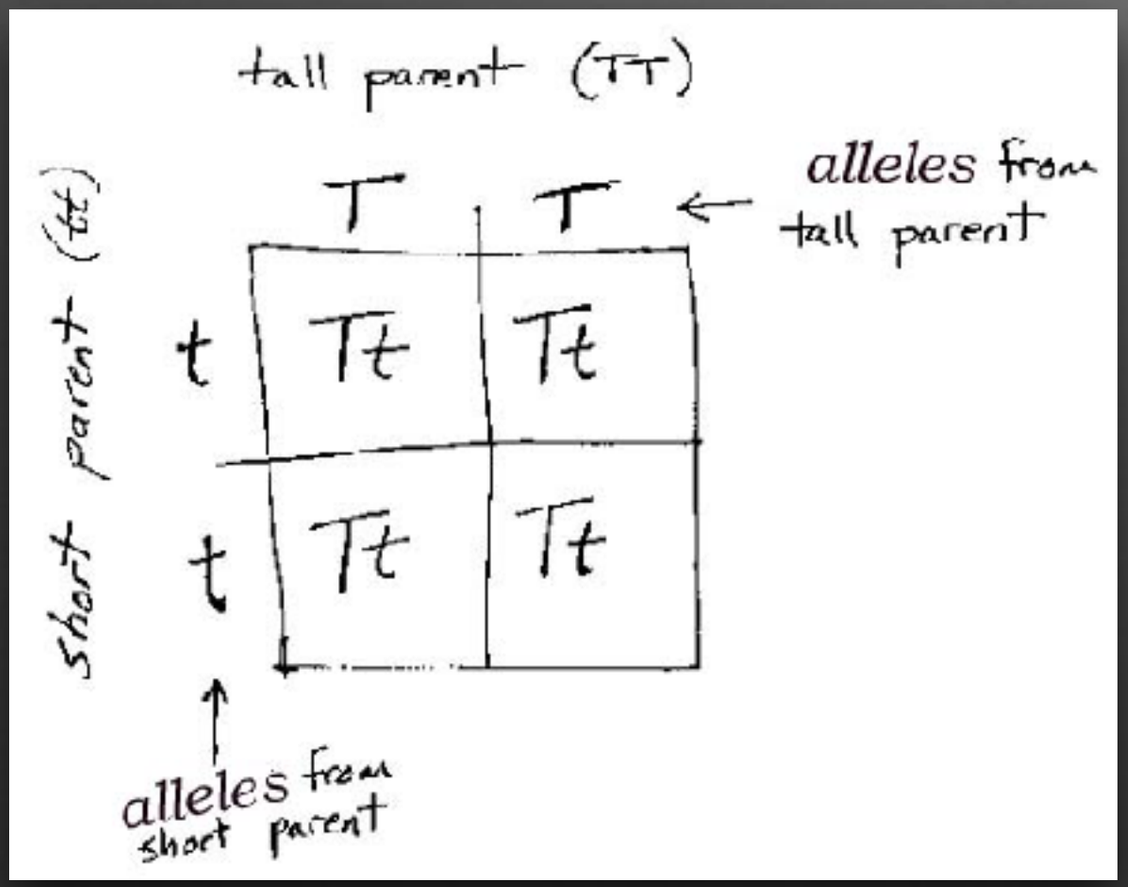
Alleles in Mendel's Crosses

In Mendel′s cross, the purebred tall plant has two alleles for tall stems. The purebred short plant has two alleles for short stems. The F1 plants each inherited an allele from each purebred parent.

The F1 plants would be considered hybrids: they have two different alleles for the trait – one allele for tall stems and one for short stems. The plants were tall because the dominant allele was for tall.



Symbols for Alleles



Geneticists use letters to represent alleles. A capital letter is used to represent a dominant allele and a lowercase version of the same letter is used to represent the recessive allele.

Two dominant alleles for tall would be represented as TT. The F1 pea plants would be represented as Tt, which would be an allele for a tall trait and an allele for a short trait.

Significance of Mendel

Mendel's discovery was not recognized during his lifetime. In 1900, three different scientists rediscovered Mendel's work. Because of his work, Mendel is often called the Father of Genetics.

Keywords: English — Spanish

Heredity - Herencia

Traits - Rasgos

Genetics - Genética

Fertilization - Fertilización

Pollination - Polinización

Dominant Allele - Alelo Dominante

Recessive Allele - Alelo Recesivo